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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/918,438	08/01/2001	Yukio Michishita	234824/00	4751

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EXAMINER	
LEUNG, CHRISTINA Y	
ART UNIT	**PAPER NUMBER**
2633	7

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/918,438	MICHISHITA ET AL.
	Examiner	Art Unit
	Christina Y. Leung	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☒ Claim(s) *1 and 6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

2. Claims 1 and 6 are objected to because of the following informalities:

Claim 1 recites "the group" twice in lines 7 and 8 of the claim. Although Examiner understands from Applicants' specification (such as Figure 2) and from dependent claims 2 and 4 that the claim is directed to transmitting a control light corresponding to each of multiple groups "in case the number of transmitted signal lights in [that particular] group is smaller than x," Examiner respectfully suggests changing the two occurrences of the phrase "the group" in lines 7 and 8 (such as to "each group") because the method includes more than one group. Examiner notes that the step of grouping as recited in claim 1 would necessarily create more than one group.

Claim 6 similarly recites the phrase "the group" in lines 7 and 9 of the claim and is also objected to for the same reasons as claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakajima et al. (US 6,522,803 B1).

Regarding claim 1, as well as the claim may be understood with regard to the claim objection above, Nakajima et al. disclose a wavelength division multiplexing optical transmission method (Figure 11; details of routing portion 2 are further shown in Figure 13) wherein n (n: 4 or a larger integer) pieces of signal lights can be transmitted, comprising the steps of:

grouping transmittable n (n: 4 or a larger integer) pieces of signal lights by x pieces (x: integer, 2<=x<n) (Nakajima et al. show in Figures 11 and 13 at least n=8 pieces grouped by x=4 pieces for example); and

transmitting a control light (from dummy light sources 61, multiplexer 8, and coupler 9) having the same power as the total power of signal lights not transmitted in the group in case the number of transmitted signal lights in the group is smaller than x (column 9, lines 31-34; column 11, lines 28-67).

Figure 11 shows how a control light containing one or more wavelengths may be added through couplers 81-84 to each of the four groups on output links 1-4 respectively. Again, Figure 13 shows details of routing portion 2 and shows how each of the input/output links in Figure 11 include a group of signal light pieces.

Regarding claim 2, Nakajima et al. disclose that in case the number of transmitted signal lights in one group is smaller than x, the total level of the transmitted signal lights and the control light is equal to the total level of transmittable x pieces of signal lights in the group (column 9, lines 31-34; column 11, lines 28-67).

Regarding claim 4, Nakajima et al. disclose that a control light transmitted in each group may have the same wavelength as that of a signal light last transmitted in the corresponding group, since they disclose that the control light may have the same wavelength as a regular signal light not currently used and thereby replace that signal light (column 9, lines 31-34).

Regarding claim 5, Nakajima et al. disclose that the control light may be an unmodulated, or in other words, a continuous wave, light (column 9, lines 16-18).

Regarding claim 6, as well as the claim may be understood with regard to the claim objection above, Nakajima et al. disclose a wavelength division multiplexing optical transmission method (Figure 11; details of routing portion 2 are further shown in Figure 13) wherein n (n: 4 or a larger integer) pieces of signal lights can be transmitted, comprising the steps of:

grouping transmittable n (n: 4 or a larger integer) pieces of signal lights by x pieces (x: integer, 2<= x<n) (Nakajima et al. show in Figures 11 and 13 at least n=8 pieces grouped by x=4 pieces for example); and

transmitting a control light (from dummy light sources 61, multiplexer 8, and coupler 9) having the same power as the total power of signal lights not transmitted in the group and having the same wavelength as that of a signal light last transmitted in the group in case the number of transmitted signal lights in the group is smaller than x (column 9, lines 31-34; column 11, lines 28-67).

Nakajima et al. disclose that a control light transmitted in each group may have the same wavelength as that of a signal light last transmitted in the corresponding group, since they disclose that the control light may have the same wavelength as a regular signal light not currently used and thereby replace that signal light (column 9, lines 31-34).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. in view of Okano et al. (US 6,449,074 B1).

Regarding claim 3, Nakajima et al. disclose an optical transmission method as discussed above with regard to claim 1, including an optical transmission line (such as output link 1 in Figure 11) on which a signal light and a control light are propagated. Nakajima et al. further disclose that the transmission line is regulated by an optical post-amplifier such as shown in Figure 11.

They do not specifically disclose that the optical transmission line is preset so that the wavelength characteristic is flat in case light acquired by multiplexing n pieces of signal lights is propagated (or in other words, that it is flat when all the regular signal lights are present and the control light signal is not transmitted).

However, Okano et al. in particular teach optical amplification with level control in a wavelength division multiplexed system (Figure 2) such as already described by Nakajima et al.

They further specifically suggest that the wavelength characteristic is flat when a set of signal lights having different wavelengths is input to the amplifier (column 5, lines 61-65).

It would have been obvious to a person of ordinary skill in the art to provide a flat wavelength characteristic such as taught by Okano et al. in the method disclosed Nakajima et al. in order to provide the same level of amplification/gain to each channel regardless of wavelength in order to treat the input channels equally. One in the art would have been particularly motivated to combine the teachings of Okano et al. with the system described by Nakajima et al. to prevent any one channel to be arbitrarily amplified at a different ratio since the method already disclosed by Nakajima et al. is specifically concerned with regulating the power level of multiple channels transmitted together on a transmission line.

7. Claims 7-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita (US 6,426,817 B1) in view of Nakajima et al.

Regarding claim 7, Tomita discloses a wavelength division multiplexing optical transmission system (Figure 3), comprising:

one or more signal light transmitters that respectively transmit a signal light (not explicitly shown in Figure 3, although the figure shows signal lights λ1-λ16, but a transmission unit is disclosed in column 2, lines 52-55; Figure 6 also shows optical transmitters OS);

a first optical multiplexer (WDM coupler 20) provided with pieces of signal light input ports;

an optical branching device (coupler 23) that branches light output from the first optical multiplexer;

a control light transmitter (light source 25) that transmits a control light based upon the level of the branched light from the optical branching device (column 5, lines 17-20);

a second optical multiplexer (coupler 21) that multiplexes light output from the first optical multiplexer 20 and the control light;

an optical transmission line on which multiplexed light output from the second optical multiplexer is propagated (not explicitly shown in Figure 3, but a transmission line connected to the system is clearly indicated in the figure).

Although Tomita discloses that the system transmits at least 4 signal lights (Figure 3 shows 16 signal lights, for example) and that the first multiplexer includes a plurality of input ports to accommodate them, Tomita does not specifically disclose that the system transmits "n (n: 4 or a larger integer) pieces of signal lights" while the multiplexer is provided with less than n pieces of signal light input ports. However, large networks including multiple groups of wavelengths multiplexed by separate multiplexers and transmitted on separate transmission lines are well known in the art. In particular, Nakajima et al. teach a wavelength division multiplexed system, related to the one disclosed by Tomita, including means for transmitting control light 61 to compensate for regular signal wavelengths that may not be present on the transmission line (Figures 3, 11, and 13). Nakajima et al. further teach that the system includes a plurality of signal

It would have been obvious to a person of ordinary skill in the art to specifically input only some of the total plurality of signal lights into a first multiplexer as suggested by Nakajima et al. in the system disclosed by Tomita so that the system can accommodate many signals on multiple transmission lines that can eventually transmits various signals in different directions to multiple destinations. In other words, Nakajima et al. generally suggest that the system disclosed by Tomita may be expanded into a system having more than one group of wavelength division multiplexed signals so that more users are ultimately connected together in the communication network..

Tomita does not further disclose demultiplexer and optical receivers, but it is also well known in the art that signals that are wavelength division multiplexed such as already disclosed by Tomita may be eventually demultiplexed and received by optical receivers. Nakajima et al. in particular also teaches that multiplexed signals transmitted on a transmission line may be thusly recovered (for example, Figures 14 and 15 show demultiplexer 11 connected to input link 1 and link 1 optical receiver 101 which recovers a plurality of signals). Again, it would have been obvious to a person of ordinary skill in the art to include a demultiplexer and optical receivers as suggested by Nakajima et al. in the system disclosed by Tomita simply so that the information contained in the signals is actually recovered at a communication destination.

Regarding claim 8, Tomita further discloses that the control light transmitter outputs a control light of power equivalent to difference between the following levels in case the level of branched light from the branching device is lower than the total level of pieces of signal lights (column 4, lines 63-67; column 5, lines 1-20).

Regarding claim 9, Tomita in view of Nakajima et al. describe a system as discussed above with regard to claim 7, but Tomita does not specifically suggest that the control light has the same wavelength as that of a signal light last transmitted from the transmitters output from the first multiplexer.

However, Nakajima et al. teach that a control light may have the same wavelength as that of a signal light last transmitted from the pieces of signal light transmitters corresponding to the control light transmitter, since they disclose that the control light may have the same wavelength as a regular signal light not currently used and thereby replace that signal light (column 9, lines 31-34). Nakajima et al. further teach that the control light may be modulated (column 9, lines 16-17), in which case a control signal having a same wavelength as a regular signal light may convey data in the system and be easily received by an optical receiver already in place for receiving the regular signal under normal conditions (column 13, lines 1-30). Examiner notes that Tomita also discloses that providing a control light with the same wavelength as that of a regular signal light last transmitted is already generally known (column 2, lines 15-19).

It would have been obvious to a person of ordinary skill in the art to have a control light be a same wavelength as that of a signal light last transmitted from the pieces of signal light transmitters as suggested by Nakajima et al. in the system described by Tomita in view of Nakajima et al. in order to use the control light to provide diagnostic information in a way that is conveniently received by an existing optical receiver if desired.

Regarding claim 12, as similarly discussed above with regard to claim 7, Tomita discloses a wavelength division multiplexing optical transmission system (Figure 3), comprising:

one or more signal light transmitters that respectively transmit a signal light (not explicitly shown in Figure 3, although the figure shows signal lights $\lambda 1$-$\lambda 16$, but a transmission unit is disclosed in column 2, lines 52-55; Figure 6 also shows optical transmitters OS);

a first optical multiplexer (WDM coupler 20) provided with pieces of signal light input ports;

an optical branching device (coupler 23) that branches light output from the first optical multiplexer;

a control light transmitter (light source 25) that transmits a control light based upon the level of the branched light from the optical branching device (column 5, lines 17-20);

a second optical multiplexer (coupler 21) that multiplexes light output from the first optical multiplexer 20 and the control light;

an optical transmission line on which multiplexed light output from the second optical multiplexer is propagated (not explicitly shown in Figure 3, but a transmission line connected to the system is clearly indicated in the figure).

Although Tomita discloses that the system transmits at least 4 signal lights (Figure 3 shows 16 signal lights, for example) and that the first multiplexer includes a plurality of input ports to accommodate them, Tomita does not specifically disclose that the system transmits "n (n: 4 or a larger integer) pieces of signal lights" while the multiplexer is provided with less than n pieces of signal light input ports. However, large networks including multiple groups of wavelengths multiplexed by separate multiplexers and transmitted on separate transmission lines are well known in the art. In particular, Nakajima et al. teach a wavelength division multiplexed system, related to the one disclosed by Tomita, including means for transmitting control light 61 to compensate for regular signal wavelengths that may not be present on the transmission line (Figures 3, 11, and 13). Nakajima et al. further teach that the system includes a plurality of signal lights, only some of which are connected to a first multiplexer (Figure 13 shows details of routing portion 2 in Figure 11 and shows several multiplexers 107, one of which may be a first multiplexer).

It would have been obvious to a person of ordinary skill in the art to specifically input only some of the total plurality of signal lights into a first multiplexer as suggested by Nakajima et al. in the system disclosed by Tomita so that the system can accommodate many signals on multiple transmission lines that can eventually transmits various signals in different directions to multiple destinations. In other words, Nakajima et al. generally suggest that the system disclosed by Tomita may be expanded into a system having more than one group of wavelength division multiplexed signals so that more users are ultimately connected together in the communication network..

Tomita does not further disclose demultiplexer and optical receivers, but it is also well known in the art that signals that are wavelength division multiplexed such as already disclosed by Tomita may be eventually demultiplexed and received by optical receivers. Nakajima et al. in particular also teaches that multiplexed signals transmitted on a transmission line may be thusly recovered (for example, Figures 14 and 15 show demultiplexer 11 connected to input link 1 and link 1 optical receiver 101 which recovers a plurality of signals). Again, it would have been obvious to a person of ordinary skill in the art to include a demultiplexer and optical receivers as suggested by Nakajima et al. in the system disclosed by Tomita simply so that the information contained in the signals is actually recovered at a communication destination.

Further regarding claim 12, Tomita further disclose that the control light transmitter 25 outputs a control light having power equivalent to difference between the following levels in case the level of branched light from the branching device is lower than the total level of all the pieces of signal lights input to the first multiplexer (column 4, lines 63-66). Tomita does not specifically suggest that the control light has the same wavelength as that of a signal light last transmitted from the transmitters output from the first multiplexer.

However, Nakajima et al. teach that a control light may have the same wavelength as that of a signal light last transmitted from the pieces of signal light transmitters corresponding to the control light transmitter, since they disclose that the control light may have the same wavelength as a regular signal light not currently used and thereby replace that signal light (column 9, lines 31-34). Nakajima et al. further teach that the control light may be modulated (column 9, lines 16-17), in which case a control signal having a same wavelength as a regular signal light may convey data in the system and be easily received by an optical receiver already in place for receiving the regular signal under normal conditions (column 13, lines 1-30). Examiner notes that Tomita also discloses that providing a control light with the same wavelength as that of a regular signal light last transmitted is already generally known (column 2, lines 15-19).

It would have been obvious to a person of ordinary skill in the art to have a control light be a same wavelength as that of a signal light last transmitted from the pieces of signal light transmitters as suggested by Nakajima et al. in the system disclosed by Tomita in order to use the control light to provide diagnostic information in a way that is conveniently received by an existing optical receiver if desired.

8. Claims 10 and 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita in view of Nakajima et al. as applied to claim 7 above, and further in view of Okano et al.

Regarding claims 10 and 11, Tomita in view of Nakajima et al. describe a system as discussed above with regard to claim 7. Tomita further discloses that the transmission line is regulated by an optical amplifier 22 operating under automatic level control, wherein the total output level of the multiplexed signal can be a predetermined value regardless of the input level (column 1, lines 46-52).

Tomita does not specifically disclose that the wavelength characteristic is flat in case multiplexed light acquired by multiplexing n pieces of signal lights is propagated (or in other words, that it is flat when all the regular signal lights are present and the control light signal is not transmitted). However, Okano et al. in particular teach optical amplification with level control in a wavelength division multiplexed system (Figure 2) such as already described by Tomita in view of Nakajima et al. They further specifically suggest that the wavelength characteristic is flat when a set of signal lights having different wavelengths is input to the amplifier (column 5, lines 61-65).

Regarding both claims 10 and 11, it would have been obvious to a person of ordinary skill in the art to provide a flat wavelength characteristic such as taught by Okano et al. in the system described by Tomita in view of Nakajima et al. in order to provide the same level of amplification/gain to each channel regardless of wavelength in order to treat the input channels equally. One in the art would have been particularly motivated to combine the teachings of Okano et al. with the system described by Tomita in view of Nakajima et al. to prevent any one channel to be arbitrarily amplified at a different ratio since the system already disclosed by Tomita is specifically concerned with regulating the power level of multiple channels transmitted together on a transmission line.

Regarding claim 11 in particular, Okano et al. also teach a control signal related to the one already disclosed by Tomita that may be inserted to compensate for absent regular signal lights. They further teach providing a flat wavelength characteristic even when an additional channel is introduced in the multiplexed light output (Figure 6; column 6, lines 60-67; column 7, lines 1-10). Again, it would have been obvious to a person of ordinary skill in the art to provide a flat wavelength characteristic such as taught by Okano et al. in the system described by Tomita in view of Nakajima et al. in order to provide the same level of amplification/gain to each channel regardless of wavelength in order to treat the input channels equally. Examiner notes that in the system suggested by Tomita in view of Nakajima et al. and Okano et al., the wavelength characteristic would be flat particularly when only one regular signal light is absent and the control signal disclosed by Tomita would therefore only provides the light power of one channel as a direct replacement in the profile of the wavelength multiplexed signal.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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